HAER
DEL
2-DELAC.V,
1A-

FORT DELAWARE, SEA WALL
Pea Patch Island
Delaware City vicinity
New Castle County
Delaware

HAER No. DE-56-A

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
U. S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

HAER
DEL
2-DELAC.V,
1A-

HISTORIC AMERICAN ENGINEERING RECORD

FORT DELAWARE, SEA WALL HAER No. DE-56-A

Location: Pea Patch Island, Delaware City vicinity, New Castle County, Delaware

USGS 7.5' Topographic Series Delaware City, DE-NJ Quadrangle.
Universal Transverse Mercator Coordinates: 18.451300.4382340

Date of Construction: 1833

Engineer: Captain Richard Delafield

Present Owner: State of Delaware; Philadelphia District, U.S. Army Corps of Engineers

Present Use: Sea Wall, Historic Site / State Park

Significance: Fort Delaware served as the primary defense of the Delaware River from the second quarter of the 19th century until the start of World War II. The Fort played an important role during the Civil War when the facility served as the largest prisoner of war camp in the North. A constant theme in the fort's history, represented by the sea wall, has been the need to exclude the tide from Pea Patch Island and to adequately drain the facilities thereon. Unsanitary conditions of the prisoner of war camp, in part stemming from poor drainage, gave the Fort the reputation of being the Union's counterpart to the infamous Confederate prisoner of war camp at Andersonville.

Project Information: The Philadelphia District of the U.S. Army Corps of Engineers proposes to undertake a deepening of the Delaware River Main Channel and has determined the project will have an accelerating effect upon erosion taking place on the southeast corner of Pea Patch Island. To arrest this erosion, the Corps will undertake certain measures including reconstruction of a breakwater. Prior to this work the Corps has agreed to conduct HAER recording of the historic breakwater section which will be impacted.

Prepared by:

Damon Tvaryanas
Hunter Research, Inc.
120 West State Street
Trenton, NJ 08608

Historical Narrative

Much of the history and the historical significance of Fort Delaware is tied to its relationship to the waters of the river which surround it. Throughout the 17th and 18th century, the present-day location of Pea Patch Island was represented on maps and navigational charts as a shoal within the Delaware River. It was not until the start of the 19th century that the landform had grown sufficiently to be recognized as an island. From the date of the first attempt to fortify the island up to the present, the developmental history of Pea Patch has been interwoven with attempts to keep the Delaware's tide waters from inundating the low-lying land mass and to adequately drain its inhabited sections.

The initial efforts at barring the tides from overflowing the island were undertaken in conjunction with the first attempt to fortify the island in 1813. In preparation for the construction of the earthwork fortification which was never actually erected, the southwest, southeast and northeast flanks of the island were strengthened by a sea wall which appears to have followed roughly the same line as that occupied by the present-day sea wall. The footprint of this embankment is shown on a map of Pea Patch Island derived from an 1815 plan in the National Archives. Captain Clark, in charge of the fortification operations noted that Pea Patch Island "was overflowed at every full tide, and continued to be until the government embanked it. The island was, like the shore between high and low water mark, bare at low and covered at the high water mark." Undoubtedly, this first tide barrier was an earthwork feature. When construction on the brownstone star fort began two years later, Captain Samuel Babcock, in charge of the fortifications' construction noted in reference to the commencement of work on the fort's foundations that, "...the natural level of the ground of the work is 15 inches below high water mark." Babcock recommended embanking the north end of the island as well. He wrote that "A tract of 8 to 10 acres would be gained and secured. I have every reason to be satisfied with the wharfing made to secure the island from surf. Each tide deposits a quantity of mud in its rear, which, in a year or two, will give a number of acres of soil in addition" (Catts et al 1983:20).

The height of the embankment walls soon proved to be insufficient to exclude the bay. In the spring of 1823, well before the date of the completion of the fort, parts of the wall were destroyed in a storm. A contributing factor in its failure was the settling which took place after the initial placement of the earth and fill. This reduced the overall height of the wall and made it more susceptible to the effects of storms, high tides and flood waters. The walls were repaired but they remained a consistent cause of concern to the fort's garrison. Brevet Major A.C.W. Fanning noted in 1827 that "the storms are continually sweeping away the embankment and the muskrats are continually boring them so that they must be dug away and replaced. Without constant supervision the island would become a perfect quagmire and covered by three feet of water at high tide" (Catts et al. 1983:44).

The tide barrier was extended into a full circuit under Babcock's supervision and this enabled the construction of several buildings inside the sea wall on the southeast side of the island in areas formerly subjected to heavy tidal action. During this period the wall appears to have enclosed approximately 70 acres of land (roughly the same area that it encloses today). The embankment project also included the excavation of a network of crisscrossing drainage ditches which allowed for the raising of an oat and hay crop on the island interior. These initial drainage features appear on a map taken from a plan of 1834 in the National Archives. This plan shows the expanded footprint of the sea wall as well as the large drainage ditch which paralleled it on its interior. The plan also depicts wharfs on the southern and western sides of the island and shows the full foot print of the star fort, its moat and sluiceway. In spite of these drainage activities the ground surface within the sea wall remained swampy. This affected living conditions within the fort and led to an extremely unhealthy environment for the soldiers and workmen stationed there (Catts et al. 1983:20, 24).

The construction efforts undertaken by Captain Richard Delafield which followed in the wake of the fire which destroyed the star fort also involved considerable strengthening of the defensive perimeter. Although Delafield accomplished little in terms of the construction of the fort he was sent to Pea Patch Island to erect, he did manage to make considerable repairs and alterations to the sea wall. Beginning in 1833, most of these activities took place along the sea wall's original alignment, but a reconfiguration of the tide barrier on the northwestern end of the island also took place. Following Delafield's demolition of the old walls of the star fort, the stone was taken down to the embankment walls and cast over the edge in order to strengthen the sea wall. Delafield wrote that "the dike is now in excellent order. The interior is supported by a revetment of masonry, resting upon a platform of timber. The exterior slope is covered to some depth by the materials from the old fort" (Catts et al. 1983:26). This narrative appears both to match the plans of 1834 for the sea wall construction in the National Archives (Record Group 77, Drawer 48, Sheets 7-9) and to describe the earliest surviving sections of the sea wall currently in place.

As outlined in the narrative history of Fort Delaware above, work stopped on the new fort in 1838 and was not again taken up until 1848. Brevet Major John Sanders, in charge of the work at that date, reported that in October of 1846, two years previously, the highest tide known since the sea wall was first erected had overwhelmed the island, entirely submerging it. Sanders was forced to clear many of the materials and items of equipment left on the island when construction activities halted in 1838. Several of the 2,000 logs and much of the lumber brought to the island by Delafield had to be removed from the drainage ditches into which they had been washed and were placed on the embankment. In his annual report of 1848, Sanders noted that "[t]he embankments or dikes enclosing the meadow lands on the Delaware generally required to be raised a foot or more every two years. That around this island was originally too low, it has moreover settled and more a great deal since the works were suspended. The sediments in the ditches which has been accumulated for many years had at last nearly filled them up."

These ditches were dug out, the fort's sluiceway and gate were repaired, three new wooden wharfs were constructed and the embankment wall around the island was reinforced with additional stone. The sea wall was also supplemented with a number of new groins and jetties that extended out from the island perimeter, while an elaborate system of ditches was built over the interior of the island, including one continuous ditch that paralleled the inside face of the sea wall and numerous cross-ditches that were designed to control high tide and flood waters. This network of features is depicted on a plan derived from an 1855 drawing from the records of the Corps of Engineers now at the National Archives.

No changes to the sea wall's height or configuration are known to have taken place in the period between the completion of the present Fort Delaware and the start of the Civil War. Ground level within the embankment remained approximately six feet below high water mark. Due to the resultant poor drainage living conditions on the island were bad and only worsened when prisoners were introduced. When the first new barracks were constructed to house the influx of Confederate prisoners in 1863, the walls and foundations sunk nearly a foot into the swampy earth as soon as weight of their occupants was introduced to them (Catts et al. 1983:35). A prisoner experiencing the unhealthy condition of the camp noted that the waters of the Delaware still "... percolated through the thin levees and permeated the black porous soil until in rainy weather the island seemed a plat of mud" (Catts et al. 1983:46). The ground surface was so muddy that brick and plank walkways had to be erected nearly everywhere around the island. The prisoners themselves set about depositing the ashes from their fires within the barracks area in attempt to raise the ground surface enough to provide a reasonable living surface (Catts et al. 1983:46). Perhaps the best historic image of the sea wall comes from the Neugas drawing of 1864, which clearly shows the earthen and stone mound on the exterior of the wall, the exposed cut stonework of the interior face of the wall within the drainage ditch, and the numerous bridges which crossed this moat to provide access to the guard towers and privies constructed atop the embankment.

Following the end of the Civil War, Fort Delaware entered a period of relative stability. The fort itself and the sea wall were maintained but the prison camp era facilities were allowed to deteriorate. Many of the poorly constructed buildings were removed entirely at this time. Severe storms in 1870 and 1876 caused heavy damage to the sea wall but this was relatively quickly repaired. In 1878 an even more substantial storm hit the Lower Delaware Valley, submerging the island beneath two to four feet of water. In the wake of this storm, it was recommended that the height of the sea wall be raised by another two feet from 11 to 13 feet above mean lower water level (Catts et al. 1983:45).

Throughout the last quarter of the 19th century, little additional work beyond simple maintenance is recorded for the fort's sea wall. The footprint of the sea wall and the large network of drainage ditching which existed at that time all appear on a map derived from a plan

of 1905. During the first decade of the 20th century, the placement of dredge spoils on the island greatly altered the relationship between the embankment and the island. The average 12-foot depth of the fill placed within the embankment raised the ground level above the top of the embankment. Additionally, fill was placed to the north and west of the sea wall subsuming the tide barrier and greatly expanding the acreage of Pea Patch Island. This dramatic increase in the area of the island above the mean low water mark is expressed in a plan which shows the 1905 limits of the island superimposed over the outline of the island as it is depicted by the current Delaware City, Del. USGS 7.5 minute topographic quadrangle sheet.

Descriptive Narrative

The sea wall surrounding Fort Delaware on Pea Patch Island represents the end product of numerous maintenance and construction episodes which took place over a span of over 150 years. Beginning in the first quarter of the 19th century, as an earthwork embankment, the sea wall was rebuilt during the 1820's as a stone revetment in conjunction with a drainage canal which ran parallel to it along its interior face. The stone sea wall surrounding the fort extended for 1 1/3 miles and enclosed between 70 and 80 acres. Much of this early sea wall has either been lost to erosion or has been obscured through the deposition of dredge spoil in the early 20th century. While the northern and western sections of the wall may lie preserved beneath several feet of fill, along the northeastern face of the island, tide and wave action has eliminated nearly all of the wall's vertical expression. Low lying but well defined remains of the sea wall are visible on this side of the island to a point approximately 1,200 feet to the north of the mouth of the sluiceway. South of the sluiceway, however, the northeastern leg of the sea wall has been reduced to little more than a low pile of jumbled rock. Severe erosion along the southeast bank of the island has entirely removed the eastern corner of the sea wall and has exposed a more intact section of the wall along the eastern end of the island's southeastern face.

The interior face of the sea wall was composed of cut, dry laid, coursed granite masonry. The blocks range in size from approximately 2.5 feet x 1.5 feet x 1.5 feet to 1.5 feet x 1 feet x 6 inches. To reinforce the joints between the blocks, individual stones were linked together at their ends by iron straps. These straps, now visible in several locations due to the deterioration of the wall, have become heavily corroded in the brackish water environment. Where sections of this inner facing survive, it is possible to observe that it is approximately three feet in width and projects three courses above the ground surface. This inner facing also formerly served as the outer lining of a deep drainage ditch or canal (presently in-filled) which ran along the inner edge of the sea wall. Thus, it may be expected that lower elements of stone facing survive *in situ* beneath the ground surface within the in-filled trench of the drainage ditch.

On the river side of the wall, unlaid stone has been piled in large quantities to form the outer face of the wall. This mass of rocks is largest along the southern face of the wall. Here the stone layer extends several feet in depth and seems to consist of trap rock, granite and sandstone. Many of these randomly placed stone blocks appear to have been worked and thus likely belonged to the masonry walls of the 1820s star fort which were disassembled and dumped on the edge of the sea wall in the 1830s.

On the southeastern and northeastern legs of the wall, large interlocking squared wooden beams have been exposed in several locations. These wooden members, up to a foot thick and between 8 and 12 feet in length, are interconnected by means of simple notched joints secured with treenails. The interlocking members represent the grillage laid as foundations for the outer edge of the sea wall. This heavy network of beams would have kept the large mass of piled stone from sinking into the bed of the Delaware Bay. Along the eastern edge of the island the grillage lies flat on the ground surface exposed along the marshy edge of the island. Here, the grillage consists of two parallel runs of timbers (approximately 6 feet apart) linked approximately every eight feet by perpendicular members. The grillage is situated approximately 10 feet to the outside of the line which marks the former location of the cut stone revetment.

On the southeastern leg of the sea wall, grillage is exposed at two locations. On the eastern end of the southeastern leg, a section of grillage approximately 40 feet in length is visible at low tide at the bottom of the exterior face of the sea wall. The members which comprise this section of grillage consist of 10 beams laid perpendicular to the line of the wall. These beams, spaced approximately 5 feet apart, are joined by means of notched construction to a single member running parallel to the wall and underlying the other members. Another section of grillage is exposed approximately 320 feet further to the south and west. This length of interconnected timbers is closer in the method of design and construction to that which is observable along the northeastern leg of the wall. This section has been anchored in place through the placement of pilings tied to the network of horizontal members. All of the grillage visible on the southeastern leg of the sea wall lies further outboard than that observed along the northeastern leg and may represent surviving remains from the outermost edge of the sea wall. It is likely that other sections of grillage survive beneath the relatively intact mounded rock between the inner cut stone revetment/lining and the currently exposed outmost sections of grillage.

Sources of Information/Bibliography:

Engineering Drawings:

National Archives, Cartographic Branch. "Map of Pea Patch Island Showing Locations of Fort. Drawn by Thomas I. Leslie." Record Group 77, Dr. 48, Sht. 31-6, 1815.

------. "An Outline of the Star Fort." Plan. Record Group 77. Drawer 49a-2, Sheet No. 1, 1815.

------. "State of Delaware. Project Fort for the Pea Patch, Drawn by W. Tell Poussin Capt. Top. Engrs. Includes a Map of the Island and a Separate Plan of the Fort.." Plan. Record Group 77, Dr. 49a-1, ca. 1815.

------. "Pea Patch Island. Survey of Lt. W. G. Williams, 7th Infy. Actg. Asst. T. Engr. Assistants T. F. Drayton 6th Infy., and Sill, 1st Arty. Drawn by Lt. Sill, Delaware River." Plan. Record Group 77, Dr. 48, Sht. 4, 1833.

------. "Pea-Patch Island Survey. Leveled and Surveyed Under the Direction of Lt. W.G. Williams U.S. Army by Lts. Drayton and Sill. Drawn by Lt. Drayton. Cross Sections of Dyke Noted on the Horizontal Projection." Plan. Record Group 77, Dr. 48, Shts. 8,9 (2 Sheets), 1834.

------. "Plan for Rebuilding Fort Delaware as Designed by Captain R. Delafield, Philadelphia, April 1836." Plan. Record Group 77, Drawer 49a-5, 1836.

------. "Project for Rebuilding Fort Delaware as Designed by the Board of Engrs. Drawn by Lt. H. Wager Halleck, Corps of Engrs." Plan. Record Group 77, Dr. 43, Sht. 12, 1839.

------. "Sketch of Pea Path Island. Drawn Under the Direction of Maj. John Sanders, Corps of Engrs. By 2d Lt. Jas. St. C. Morton, Corps of Engrs. Confidential (Ltr. of Maj. Sanders)." Plan. Record Group 77, Dr. 48, Sht. 21, 1855.

------. "Plan of the Pea Patch Island, Showing the Moat Around Fort Delaware, and the Island Ditches. 2616 S (A.G.O.)." Plan. Record Group 77, Dr. 48. Sht. 23, 1865.

------. "No. 1.:-Plan Showing Outline of the Fort and Accessories Drawn Under the Instruction of Lt. Col. C. S. Stewart, Corps of Engrs.." Plan. Record Group 77, Dr. 49, Sht. 91, 1868.

------. "Pea Patch Island." Plan. Record Group 77, Dr. 49-114-2, 1905.

National Archives, Cartographic Branch. "Sketch of Pea Patch Island, Scale 200' - 1, Showing Site of Fort, Canal, Ditch, Spot Occupied by Piles and Drawings of a Pile Driving Machine." Plan. Record Group 77, Dr. 48, Sht. 31-7, n. d.

Additional Plans of Fort Delaware, Pea Patch Island and Delaware River Defenses are available at the National Archives, Cartographic Branch. Record Group 77.

Historic Views:

Neugas, Max. "Sketch of Pea Patch Island." Wilmington, Delaware: On file, Historical Society of Delaware, 1864.

Bibliography:

Bevan, Wilson Lloyd, Ph.D., editor. *History of Delaware, Past and Present*. New York, New York: Lewis Historical Publishing Company, Inc., 1929.

Catts, Wade P. *Garrison Life at Fort Delaware During the Civil War*. Unpublished Masters' Thesis. Newark, Delaware: On file, Morris Library, The University of Delaware, 1979.

Catts, Wade P., Ellis C. Coleman, and Jay F. Custer. "A Cultural Resources Study and Management Plan for Fort Delaware State Park." Newark, Delaware: University of Delaware, Department of Anthropology, Center for Archaeological Research, 1983.

Coghlan, G. M., and Dale Fields, editor. *Index to History of Delaware, 1609-1888*. Wilmington, Delaware: The Historical Society of Delaware, 1976.

Cromwell, Robert, Michael D. Scholl, and Cara Lee Blume. "A Blast from the Past: Recovery of the Fort Delaware Gun Carriages and Other Archaeological Remains from an Eroding Shoreline." Philadelphia, Pennsylvania: On file, U.S. Army Corps of Engineers, Philadelphia District, 1997.

Fisher, Joshua. "A Chart of Delaware Bay and River, Containing a Full and Exact Description of the Shores, Creeks, Harbors, Soundings, Shoals, Sands and Bearings of the Most Considerable Land Marks." Wilmington, Delaware: On file, Historical Society of Delaware, 1756.

The Fort Delaware Society. *Fort Delaware Newsletter*. Wilmington, Delaware: The Fort Delaware Society.

------. *Fort Delaware Notes*. Wilmington, Delaware: The Fort Delaware Society.

Fort Delaware Society Archives. "Letters of Sergeant Joseph H. Enos." New Castle, Delaware: On file, Fort Delaware Society Archives, New Castle Library, n.d.

Hancock, Harold B. *Delaware During the Civil War: A Political History*. Wilmington, Delaware: The Historical Society of Delaware, 1961.

Keen, Nancy T.. *An Analysis of the Escapes Made by Confederate Prisoners from Fort Delaware*. Unpublished Masters' Thesis. Newark, Delaware: On file, Morris Library, The University of Delaware, 1965.

------ "Confederate Prisoners of War at Fort Delaware." *Delaware History* 13 (1968): 1-27.

Lewis, Emanuel R. *Sea Coast Fortifications of the United States: An Introductory History*. Annapolis, Maryland: Leeward Publications, Inc., 1979.

Rickman, David. "Untitled Composite Map of Historic Fort Delaware." Dover, Delaware: Cultural and Recreational Services Section, Division of Parks and Recreation, Delaware Department of Natural Resources and Environmental Control, 1997.

Ruhlen, George. *History of Fort Delaware*. Unpublished typewritten manuscript. New Castle, Delaware: On file, Fort Delaware Society Archives, New Castle Library, n.d.

Scharf, J. Thomas. *History of Delaware 1609-1888*. Philadelphia, Pennsylvania: R. G. Richards and Co., 1888.

Snyder, Frank. *The District: A History of the Philadelphia District U.S. Army Corps of Engineers, 1866-1971*. Philadelphia, Pennsylvania: On file, Army Corps of Engineers, 1974.

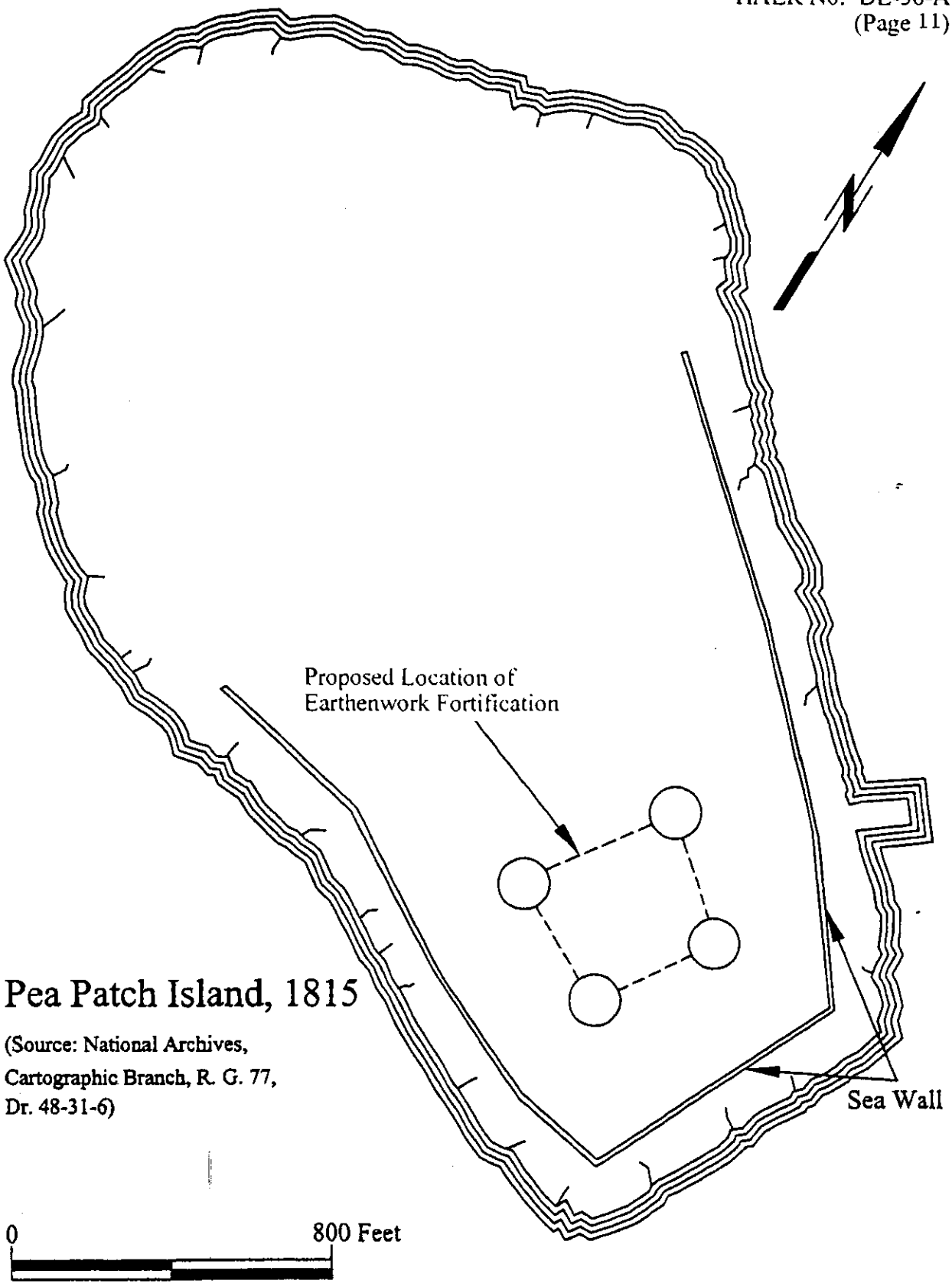
Tyler, David. *The Bay and River Delaware: A Pictorial History*. Cambridge, Maryland: Cornell Maritime Press, 1955.

U. S. Congress, House. "Survey of the Works of Fort Delaware, and Proceedings of Courtmartial of Major Babcock." 18th Congress, 2nd Session. H.Doc. 264, 1825.

Wilson, W. Emerson. *Fort Delaware*. Newark, Delaware: The University of Delaware Press, 1957.

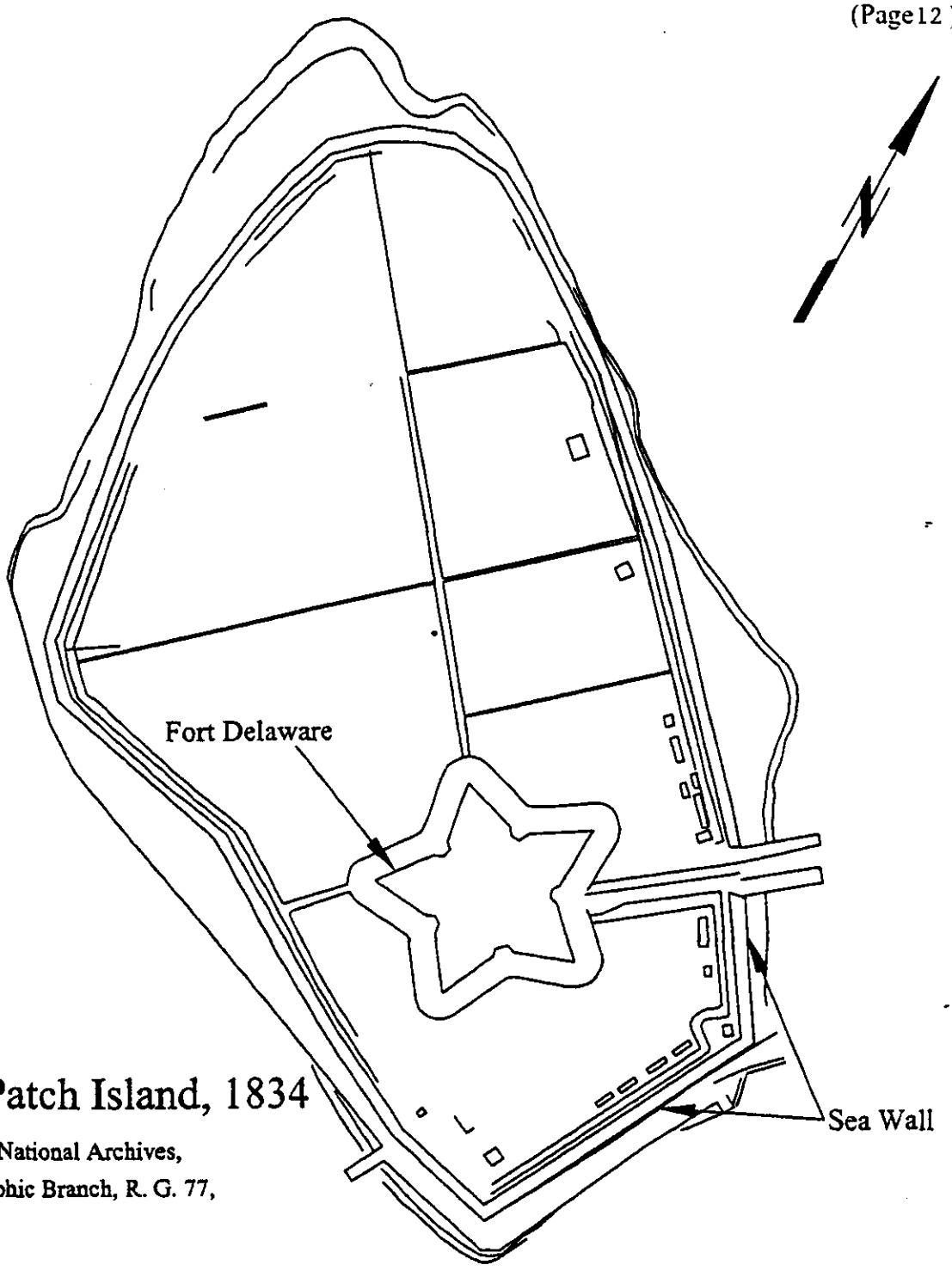
------. "America's Historic Pea Patch." *Delaware Conservationist* 20 (1973): 4-20.

------. *A Fort Delaware Journal: The Diary of a Yankee Private, A. J. Hamilton, 1861-1865.* Wilmington, Delaware: The Fort Delaware Society, 1981.



Pea Patch Island, 1815

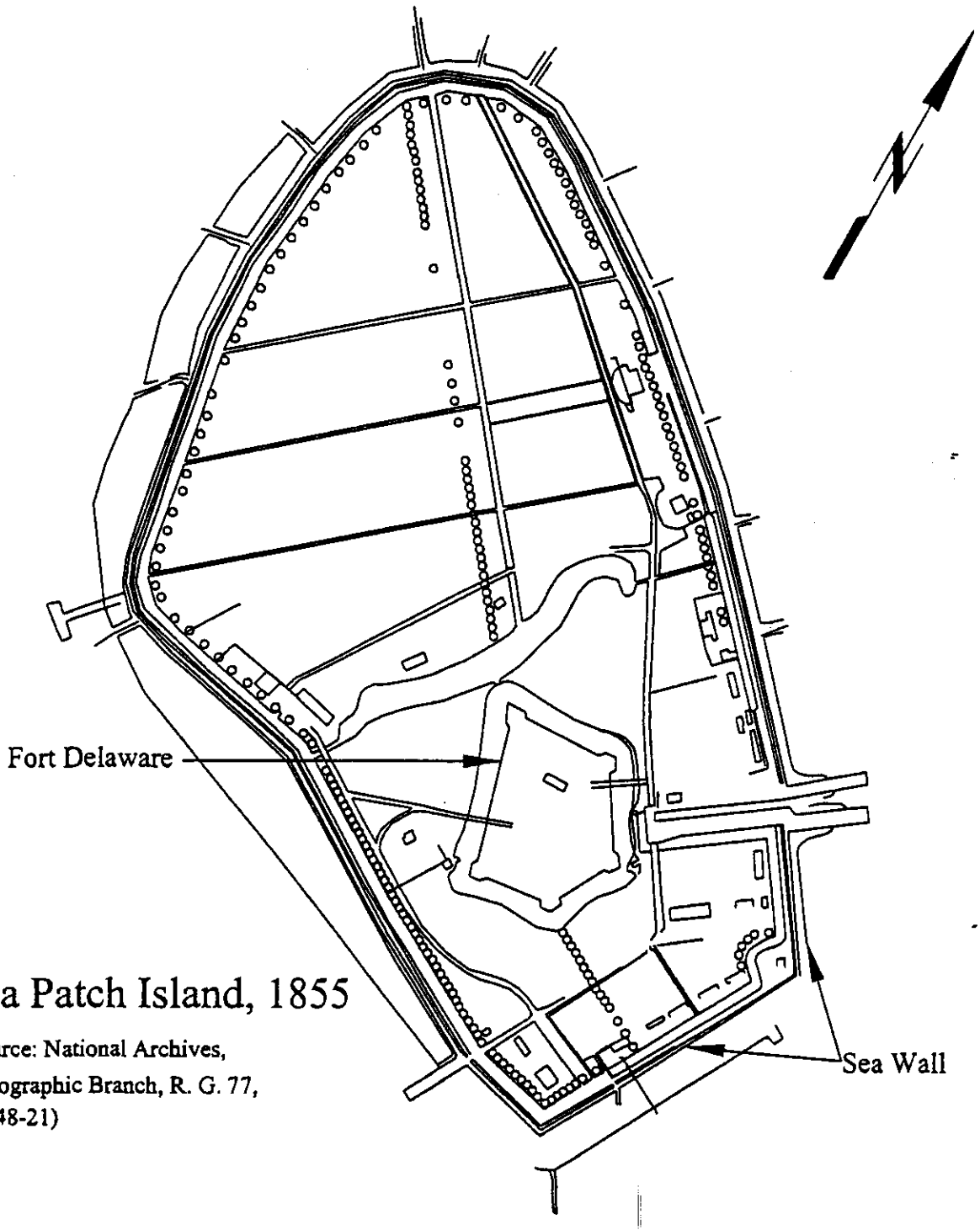
(Source: National Archives,
Cartographic Branch, R. G. 77,
Dr. 48-31-6)



Pea Patch Island, 1834

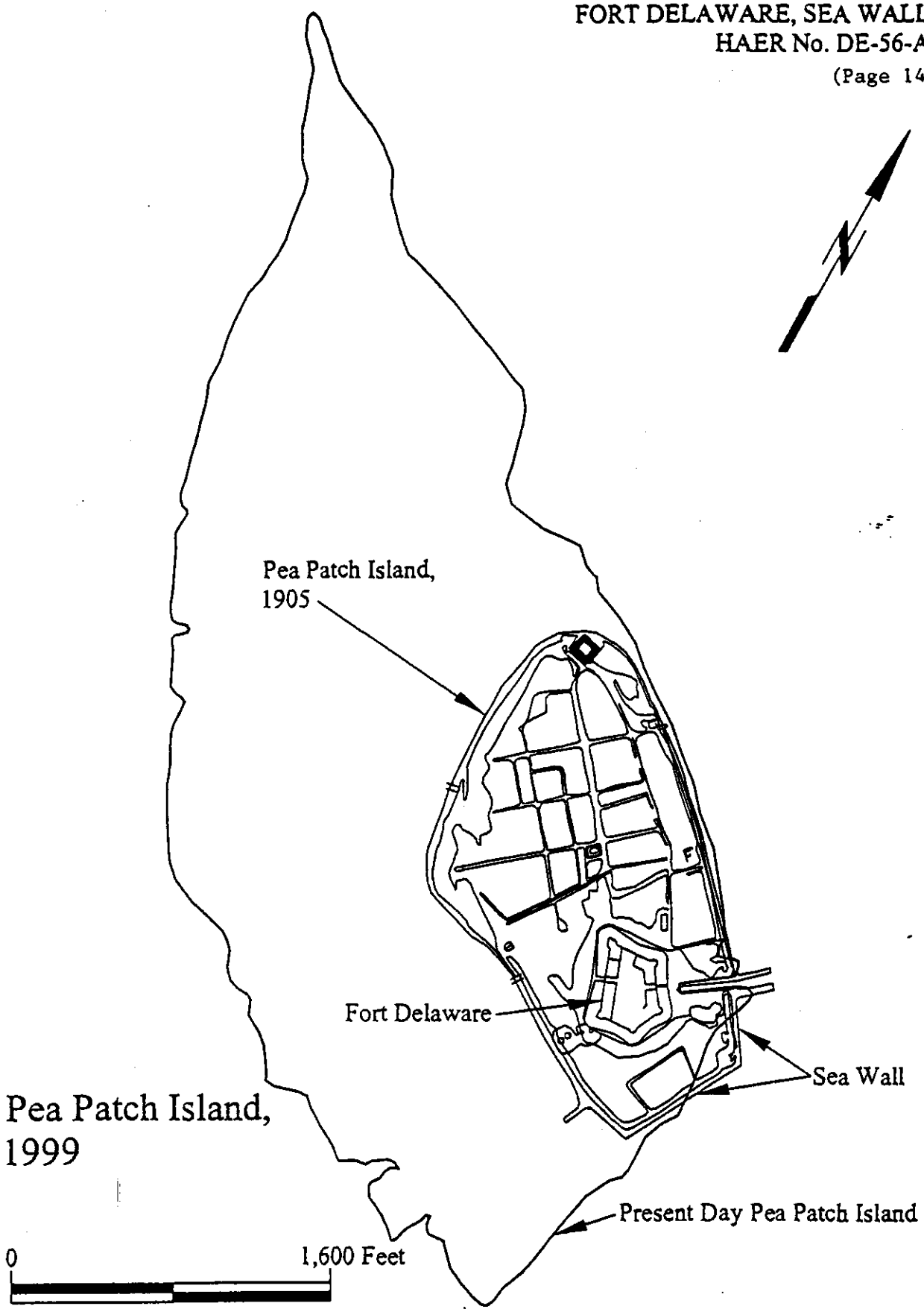
(Source: National Archives,
Cartographic Branch, R. G. 77,
Dr. 48-4)

0 800 Feet



Pea Patch Island, 1855

(Source: National Archives,
Cartographic Branch, R. G. 77,
Dr. 48-21)



Pea Patch Island,
1999